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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,224	08/08/2006	William G. Tong	07252-025US1	3313
20985 7590 01/08/2008 FISH & RICHARDSON, PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			EXAMINER WILDER, CYNTHIA B	
			ART UNIT 1637	PAPER NUMBER
			MAIL DATE 01/08/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/540,224

Applicant(s)

TONG, WILLIAM G.

Examiner

Cynthia B. Wilder, Ph.D.

Art Unit

1637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 17-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 17-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date. _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicant's amendment filed 10/17/2007 is acknowledged. Claims 1, 2 and 3 have been amended. Claims 17-22 have been added. Claims 8-16 have been canceled. All of the arguments have been thoroughly reviewed and considered but are deemed moot in view of the new grounds of rejections necessitated by Applicant's amendment of the claims. Any rejection not reiterated in this action has been withdrawn as being obviated by the amendment of the claims.

This action is made FINAL.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Previous Rejections

3. The objections to the claims 1 and 3 are withdrawn in view of Applicant's amendment. The claim rejection under 35 USC 112 second paragraph are withdrawn in view of Applicant's amendments and arguments. The claim rejections under 35 USC 103(a) are withdrawn in view of the new grounds of rejections necessitated by Applicant's amendment of the claims.

New Ground(s) of Rejections

THE NEW GROUND(S) OF REJECTIONS WERE NECESSITATED BY APPLICANT'S AMENDMENT OF THE CLAIMS:

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over McFarland et al (US 2001/0033375, October 2001) in view of Mann et al (citation made of record in IDS filed 4/2/2007) in view of Sandstrom, P (US20030174324, effective filing date August 2000) and further in view of Weinberg et al (US 6248540, June 2001). Regarding claims 1 and 4, McFarland et al teach a method comprising a microarray comprising a plurality of components (0038-041 and 0050), connecting the microarray with an optical spectroscopic system wherein said system is an optical degenerate four-wave mixing (DFWM) configuration and screening each of the materials on the microarray by scanning the microarray and collecting and measuring the DFWM signal generated (0016, 0018, 0021, 0056-0057, and 0062). McFarland et al teach that the DFWM

system is extremely sensitive and is effective to observe trace quantities of products (0062). McFarland et al additionally teach the use of an optical detector to represent the DFWM signal and wherein one or template (filters) is used which allows the photon emission to be detected by array (0090). McFarland et al cites Mann et al for discussion on how the DFWM detection system operates (0062). McFarland further teach wherein the system may involve scattering analysis (0063).

Mann et al provide a general teaching of detection and imaging of a desired target with the degenerate four wave mixing and laser induced fluorescence techniques. Mann et al teach that the detection and imaging comprises a the use of a template that blocks the DFWM probe beam and the backreflected pump beam and allows detection of the signal at a 90 degrees angle (see page 477, col. 1).

McFarland et al and Mann et al do not expressly teach that the microarray comprise a plurality of DNA cells. However, the patent broadly and indirectly suggest that oligonucleotides may be components of the array and references Pirrung et al as support for method steps of processing microarrays comprising oligonucleotides (see paragraphs 0007-0008 and 0041 which teaches that the components of the microarray may be an element, a chemical, or a material of a mixture of elements and chemicals).

Sandstrom provides a method for processing microarrays comprising oligonucleotides and methods for screening polymers on microarrays to detect biological activity (0126-0142). Sandstrom et al teach wherein the microarray

may be combined with optical signal detection techniques (0008-0021 and 0039-0053).

Weinberg et al teach a method for screening compounds attached to a microarray, wherein said screening of said array further comprise detection via optical spectroscopic techniques (col. 10, lines 12-26 and col. 27, lines 38-44), wherein said optical spectroscopic techniques include the use of a degenerate four wave mixing optical technique (col. 28, lines 52-57). Weinberg et al teach that DFWM relies on the absorption properties of the species being detected and can be thought of as being analogous to absorption spectroscopy, except that it is more sensitive, more selective and has higher spatial resolution (col. 34, lines 26-57).

McFarland et al in view of Sandstrom and Weinberg et al do not expressly teach

One of ordinary skill in the art at the time of the claimed invention would have been motivated to combine microarray analysis comprising DNA with DFWM as taught by McFarland et al in view of Sandstrom and further in view of Weinberg et al based on the benefits taught by Weinberg et al that scanning and detecting array molecules via DFWM is more sensitive, more selective and has higher spatial resolution than other spectroscopic techniques.

Regarding claim 2, McFarland et al in view of Mann et al provides the method as recited above. Sandstrom et al teach wherein the microarray comprise scanning a blank area between adjacent DNA cells to determine background noise and level of hybridization and washing in preparing the DNA

cells (0019, 0053, 0107, 0148 and 0173; Specifically Sandstrom teach that the blank area allows comparison of non-specific hybridization, see 019)).

Regarding claim 3, McFarland et al teach scanning different position of the microarray at different positions to determine inhomogeneity within and between a molecule cell (0048, 0086-0088). Likewise, Sandstrom teaches scanning different areas of a microarray to determine inhomogeneity within and between molecule cells on the microarray (0019-0053 and 0126-0142).

7. Claims 5-7 and 17-22 are rejected under 35 U.S.C. 103(a) as being anticipated by McFarland et al in view of Mann et al in view of Sandstrom in view of Weinberg et al as previously described above and further in view of Tong (5600444, February 1997). Regarding claims 5-7, 17, 19, 20, and 22, McFarland et al in view of Mann et al in view of Sandstrom and further in view of Weinberg et al teach a method comprising the use of a DNA microarray combined with DFWM for screening DNA cells as previously discussed above.

McFarland et al in view of Mann et al in view of Sandstrom and further in view of Weinberg et al differs from the instant invention in that the reference does not teach wherein the DFWM comprises backward scattering or forward scattering.

Tong teach a method and apparatus using two or three beam input laser beams in nonlinear degenerate four wave mixing arrangement for ultrasensitive analytical measurement of analyte. Tong et al teach wherein the DFWM system comprises backward scattering or forward scattering. Tong teaches that DFWM

comprising backward scattering and forward scattering configuration are useful because of the phase conjugate property of the signal beam. Tong teaches that the phase conjugate property of the signal beam generated by an analyte in DFWM method has many potential applications including autocorrection of beam distortion or optical aberration (col. 13, lines 19-35).

In view of the foregoing, one of ordinary skill in the art would have been motivated to utilized DFWM having either backward scattering or forward scattering in the DNA microarray analysis method taught by McFarland in view of Sandstrom and further in view of Weinberg et al based on the benefits taught by Tong that DFWM comprising backward scattering and forward scattering configuration are useful because of the phase conjugate property of the signal beam which has many potential applications including autocorrection of beam distortion or optical aberration.

Regarding claims 18 and 21, Tong et al teach wherein the forward scattering DFWM configuration receives one pump beam and one probe beam to produce a DFWM signal (see Figure 2).

Conclusion

8. No claims are allowed. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

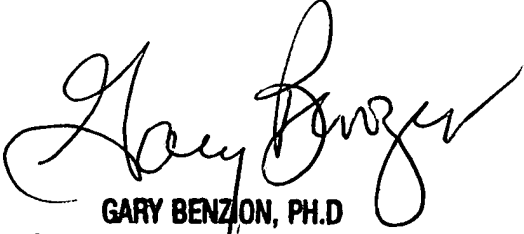
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia B. Wilder, Ph.D. whose telephone number is (571) 272-0791. The examiner can normally be reached on a flexible schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on (571) 272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Cynthia B. Wilder, Ph.D.
Patent Examiner
Art Unit 1637

12/13/2006



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